

Alice Plebe

Last update: January 17, 2023

CONTACT INFORMATION E-mail: alice.plebe@unitn.it
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CURRENT POSITION **Postdoc** 2021 – present
Department of Industrial Engineering, University of Trento, Italy
Development of autonomous driving applications using mechanisms based on biological nervous systems and human cognition.

EDUCATION **PhD in Information and Communication Technology** 2021
University of Trento, Italy
Development of cognitive-inspired deep neural networks for visual perception in autonomous driving. The work was part of the European H2020 project Dreams4Cars.
Supervisor: Prof. Mauro Da Lio

Research Visit 2020
TU Delft, Netherlands
Research collaboration with the Intelligent Vehicles group from the department of Cognitive Robotics.
Advisor: Dr. Julian F. P. Kooij

Research scholarship 2017
University of Catania, Italy
Development of simulation algorithms for hazardous fire propagation in industrial plants. The work was part of the POR FESR project SafeMod.
Principal Investigator: Prof. Sebastiano Battiato

Master's degree in Computer Science, 110/110 cum laude 2016
University of Catania, Italy
Development of multi-objective genetic algorithms to design interior illumination.
Supervisor: Dr. Mario Pavone

Bachelor's degree in Computer Science, 110/110 cum laude 2014
University of Catania, Italy
Development of computational geometric algorithms to compute the minimum-separation distance between poliedra in real time.
Supervisor: Prof. Vincenzo Cutello

INVITED SPEAKER **Workshop at the 7th International USERN Congress** 2022
Muscat, Oman
Presentation titled “The promise and the reality of autonomous vehicles”.

AWARDS **Best Student Paper Award** 2019
5th International Conference on Vehicle Technology and Intelligent Transport Systems
Paper: A. Plebe et al., “Mental Imagery for Intelligent Vehicles”.

TEACHING	Intelligent vehicles and autonomous driving	2022/23
	<i>Graduate degree in Mechatronics Engineering, University of Trento, Italy</i>	
	10 hours of teaching assistance.	
TEACHING	C++ Programming for Numerical Analysis	2022/23
	<i>Undergraduate degree in Industrial Engineering, University of Trento, Italy</i>	
	20 hours of teaching assistance.	
TEACHING	C++ Programming for Numerical Analysis	2021/22
	<i>Undergraduate degree in Industrial Engineering, University of Trento, Italy</i>	
	20 hours of teaching assistance.	
SUMMER SCHOOLS	International Summer School on AI and Games	2018
	<i>University of Crete, Chania, Greece</i>	
	40 hours of lectures focusing on the uses of artificial intelligence techniques for playing games, generating content, and modeling players.	
SUMMER SCHOOLS	Training on Deep Learning for Autonomous Vehicles – Perception	2018
	<i>NVIDIA Deep Learning Institute</i>	
	8 hours of instructor-led training on the development of autonomous vehicle applications using deep neural architectures and specialized NVIDIA computing platforms.	
SUMMER SCHOOLS	International Summer School on Deep Learning	2017
	<i>University of Deusto, Bilbao, Spain</i>	
	50 hours of lectures covering theoretical and application aspects of deep learning, including computer vision, speech recognition, and language processing.	
PROFESSIONAL EXPERIENCE	Forensic 3D virtual reconstructions of criminal events	2014 – 2021
	A total of 12 criminal proceedings, commissioned by various Public Prosecutor's offices and Defence Attorneys in several Courts from Italy.	
	Production of 3D computer graphics animations	2017
PROFESSIONAL EXPERIENCE	<i>Morpheos Srl, Catania, Italy</i>	
	Virtual presentation of a smart device for domotics application.	
	Production of 3D computer graphics animations	2015
PROFESSIONAL EXPERIENCE	<i>Temix Communication Engineering, Catania, Italy</i>	
	Virtual demonstration of a communication and surveillance system for homeland security, simulating war scenarios.	
	Internship on Software development	2013
PROFESSIONAL EXPERIENCE	<i>NCE Network Consulting Engineering, Catania, Italy</i>	
	Development of Python and XML modules for the open-source business management software OpenERP.	
	LANGUAGES	<i>English:</i>
<i>Italian:</i>		native speaker

List of Publications

JOURNAL ARTICLES

M. Da Lio, A. Cherubini, G. P. Rosati Papini, and A. Plebe, “Complex self-driving behaviors emerging from affordance competition in layered control architectures,” *Cognitive Systems Research*, vol. 79, pp. 4–14, 2023

A. Plebe, G. P. Rosati Papini, A. Cherubini, and M. Da Lio, “Distributed cognition for collaboration between human drivers and self-driving cars,” *Frontiers in Artificial Intelligence*, vol. 5:910801, 2022

M. Da Lio, R. Donà, G. P. Rosati Papini, and A. Plebe, “The biasing of action selection produces emergent human-robot interactions in autonomous driving,” *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 1254–1261, 2022

G. P. Rosati Papini, A. Plebe, M. Da Lio, and R. Donà, “A reinforcement learning approach for enacting cautious behaviours in autonomous driving system: Safe speed choice in the interaction with distracted pedestrians,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 7, p. 8805 – 8822, 2021

A. Plebe and M. Da Lio, “On the road with 16 neurons: Towards interpretable and manipulable latent representations for visual predictions in driving scenarios,” *IEEE Access*, vol. 8, pp. 179716–179734, 2020

A. Plebe, M. Da Lio, and D. Bortoluzzi, “On reliable neural network sensorimotor control in autonomous vehicles,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 21, pp. 711–722, 2020

A. Plebe and G. Grasso, “Conceptual integrity without concepts,” *International Journal of Software Engineering and Knowledge Engineering*, vol. 28, no. 7, pp. 955–981, 2018

WORKSHOPS

E. Pagot, M. Piccinini, A. Plebe, E. Bertolazzi, and F. Biral, “Real-time autonomous parking in unstructured scenarios with an indirect optimal control approach,” in *Behavior-Driven Autonomous Driving In Unstructured Environments – Workshop at the International Conference on Intelligent Robots and Systems (IROS)*, 2022

S. Mahmoud and A. Plebe, “A critical look into cognitively-inspired artificial intelligence,” in *8th International Workshop on Artificial Intelligence and Cognition (AIC)*, 2022

A. Plebe, J. F. Kooij, G. P. Rosati Papini, and M. Da Lio, “Occupancy grid mapping with cognitive plausibility for autonomous driving applications,” in *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, pp. 2934–2941, 2021

A. Plebe and M. Da Lio, “A cognitively informed perception model for driving,” in *Towards Cognitive Vehicles: is bio-inspiration helpful? – Workshop at the International Conference on Intelligent Robots and Systems (IROS)*, 2019

A. Plebe, “Mental imagery for intelligent vehicles,” in *Algorithmic, Legal, and Societal Challenges for Autonomous Driving – Workshop at the IEEE Intelligent Vehicles Symposium (IV)*, 2019

BOOK
CHAPTERS

A. Plebe and M. Da Lio, “Neurocognitive-inspired approach for visual perception in autonomous driving,” in *Communications in Computer and Information Science*, vol. 1217, pp. 113–134, Springer, Cham, 2021

A. Plebe, V. Cutello, and M. Pavone, “Optimizing costs and quality of interior lighting by genetic algorithm,” in *Studies in Computational Intelligence* (C. Sabourin, J. J. Merelo, K. Madani, and K. Warwick, eds.), vol. 829, pp. 19–39, Springer, Cham, 2019

CONFERENCES

A. Plebe and A. Plebe, “Can autonomous driving benefit from imitating human cognition?,” in *Proceedings of the 18th Annual Conference of the Italian Association of Cognitive Sciences (AISC)*, 2022

A. Plebe, G. P. Rosati Papini, and M. Da Lio, “Cognitive-inspired perceptual model for driving automation,” in *Proceedings of the 2nd Italian Conference on Robotics and Intelligent Machines (I-RIM)*, 2020

A. Plebe and M. Da Lio, “Visual perception for autonomous driving inspired by convergence-divergence zones,” in *Proceedings of the 11th International Symposium on Image and Signal Processing and Analysis (ISPA)*, pp. 204–208, IEEE, 2019

A. Plebe and M. Da Lio, “Variational autoencoder inspired by brain’s convergence-divergence zones for autonomous driving application,” in *Proceedings of the 20th International Conference on Image Analysis and Processing (ICIAP)*, vol. 11751 of *Lecture Notes in Computer Science*, pp. 367–377, Springer, Cham, 2019

A. Plebe, R. Donà, G. P. Rosati Papini, and M. Da Lio, “Mental imagery for intelligent vehicles,” in *Proceedings of the 5th International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS)*, pp. 43–51, Science and Technology Publications, 2019

A. Plebe, G. P. Rosati Papini, R. Donà, and M. Da Lio, “Dreaming mechanism for training bio-inspired driving agents,” in *Proceedings of the 2nd International Conference on Intelligent Human Systems Integration (IHSI)*, pp. 429–434, Springer, Cham, 2019

M. Da Lio, A. Plebe, D. Bortoluzzi, G. P. Rosati Papini, and R. Donà, “A system for human-like driving learning,” in *Proceedings of the 25th Intelligent Transport Systems World Congress (ITSWC)*, 2018

M. Da Lio, A. Plebe, D. Bortoluzzi, G. P. Rosati Papini, and R. Donà, “Autonomous vehicle architecture inspired by the neurocognition of human driving,” in *Proceedings of the 4th International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS)*, pp. 507–513, Science and Technology Publications, 2018

A. Plebe, V. Cutello, and M. Pavone, “Evolving illumination design following genetic strategies,” in *Proceedings of the 9th International Joint Conference on Computational Intelligence (IJCCI)*, pp. 289–296, Science and Technology Publications, 2017

A. Plebe and M. Pavone, “Multi-objective genetic algorithm for interior lighting design,” in *Proceedings of the 3rd International Workshop on Machine Learning, Optimization, and Big Data (MOD)*, vol. 10710 of *Lecture Notes in Computer Science*, pp. 222–233, Springer, Cham, 2017

A. Plebe and G. Grasso, “Particle physics and polyedra proximity calculation for haz-

ard simulations in large-scale industrial plants,” in *Proceedings of the 12th International Conference of Computational Methods in Sciences and Engineering (ICCMSE)*, pp. 090003–1–090003–4, American Institute of Physics Publishing, 2016